PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : B65H 75/18, 67/056	A1	(11) International Publication Number: WO 94/03387
		(43) International Publication Date: 17 February 1994 (17.02.94)

(21) International Application Number: PCT/GB93/01501

(22) International Filing Date: 16 July 1993 (16.07.93)

(30) Priority data:
9216617.2 5 August 1992 (05.08.92) GB

(71) Applicant *(for all designated States except US)*: DONISTHORPE & COMPANY LIMITED [GB/GB]; Friar Mills, Bath Lane, Leicester LE3 5BF (GB).

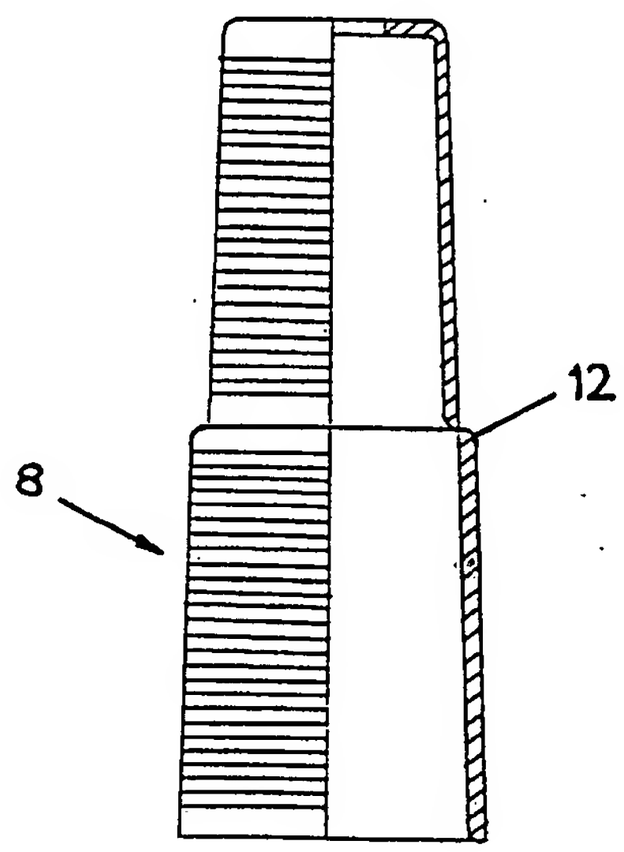
(72) Inventor; and
(75) Inventor/Applicant *(for US only)* : REID, Alexander [GB/GB]; Oaks Cottage Farm, Oaks Road, Oaks-in-Charnwood, Leicester LE12 9YD (GB).

(74) Agent: SERJEANTS; 25 The Crescent, King Street, Leicester LE1 6RX (GB).

(81) Designated States: BR, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.

(54) Title: SPLIT CONE THREAD PACKAGES



(57) Abstract

A cone (8) on which thread (10) is wound has a central frangible section (12) at which it may easily be broken. The thread (10) forms a winding on the cone at each side of the section (12) leaving a space where it crosses the section (12). The cone (8) may be snapped in half to give two independent wound cone parts, each with approximately half the amount of thread. This allows the purchaser the flexibility to use the cone in various ways. In one embodiment, the cone parts may be urged axially together after the frangible section (12) has been broken, to become removably attached to one another with a reduced space between the respective windings.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FR	France	MR	Mauritania
AU	Australia	GA	Gabon	MW	Malawi
BB	Barbados	GB	United Kingdom	NE	Niger
BE	Belgium	GN	Guinea	NL	Netherlands
BF	Burkina Faso	GR	Greece	NO	Norway
BG	Bulgaria	HU	Hungary	NZ	New Zealand
BJ	Benin	IE	Ireland	PL	Poland
BR	Brazil	IT	Italy	PT	Portugal
BY	Belarus	JP	Japan	RO	Romania
CA	Canada	KP	Democratic People's Republic of Korea	RU	Russian Federation
CF	Central African Republic			SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovak Republic
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	UA	Ukraine
DE	Germany	MG	Madagascar	US	United States of America
DK	Denmark	ML	Mali	UZ	Uzbekistan
ES	Spain	MN	Mongolia	VN	Viet Nam
FI	Finland				

TITLE

Split cone thread packages

DESCRIPTION

Technical field

The invention relates to spools, cones and like devices for holding windings of thread. It is particularly applicable to packages, upon which is wound sewing thread for industrial applications.

Background

In the clothing manufacture industry, for example, there is an increasing demand for garments to be made in small numbers at a time. Sewing thread for the making up of garments has traditionally been supplied in a number of different formats, principal among which is a cone carrying 5000 to 10000m of thread. Where smaller quantities of thread are needed, a cop spool may be preferred, which carries typically 1000m. The terms "thread" and "yarn" are used more or less indiscriminately herein, or as idiom demands.

The large capacity of the cone can be a disadvantage as production runs become smaller and large amounts of thread are often wasted. The cop spool is a small diameter tube so that the innermost turns of yarn may be undesirably tightly coiled. Because of the small capacity of cop spools, they may need to be replaced frequently, which is time consuming because the thread from the two spools needs to be joined.

Of course, an intermediate size of spool would be possible but it is inconvenient for all concerned to deal with too many different standard sizes and, besides, it will not always be clear in advance how much thread will be required in which formats.

The term "cone" as used in this specification is not intended to limit the shape of the spool on which the thread is wound and includes, inter alia, spools of generally frustoconical

and cylindrical shape.

The Invention

The invention provides a cone on which thread is wound, the cone having a central frangible section at which it may easily be broken into two parts generally perpendicularly to its axis and the thread forming a winding on the cone at each side of the frangible section, leaving a space between the windings where the thread crosses the frangible section.

In a preferred embodiment, the cone includes means for attaching together the two cone parts after the frangible section has been broken, so as to reduce the space between the respective windings. This may be achieved by one cone part being partially inserted in a hollow in the other cone part, where it is removably retained by engagement between protrusions on the respective parts.

The surfaces of the cone supporting the windings on each side of the frangible section may both taper slightly in the same axial direction.

The invention also provides a method of winding thread on a cone having a central frangible section, the method comprising the steps of: (a) rotating the cone while supplying thread through a yarn guide that reciprocates relative to a datum and parallel to the axis of the cone to wind thread on the cone at one side of the frangible section; (b) advancing the yarn guide datum through a fixed distance along the axis of the cone; and (c) rotating the cone while supplying thread through the reciprocating yarn guide to wind thread on the cone at the other side of the frangible section.

A preferred method includes the further step of (d) breaking the frangible section of the cone and urging the two cone parts axially towards one another to attach the parts

removably together with a reduced space between the two windings.

The cone of the invention will typically be wound with a similar length of yarn to the known cone, i.e. 5000 to 10000m. However, because the thread is in the form of two windings on either side of a frangible section, the new cone may be snapped in half to give two independent cones, each with approximately half the amount of thread. The two cones will be linked by a single thread, which can be easily cut or broken. If the cone is not broken, the thread will simply be withdrawn from one winding first and then the other, with no need for intervention at the halfway stage. Thus the invention allows the thread manufacturer to supply a single product, while allowing the purchaser the flexibility to make use of it in various ways.

It is a cause for concern that after the cone has been wound, the single thread bridging the gap between the windings on the respective cone parts might allow the yarn in the first winding to work loose during transport and handling of the cone. (The gap is necessary to allow the winding machine to operate). Also, handling of the wound cone without sufficient care could cause the frangible section to break prematurely.

Both these problems are solved by the further step of breaking the frangible section by urging the two cone parts together, to be removably attached with a reduced gap between the windings. A sufficient reduction of the gap will trap the single thread between the respective windings and prevent it from working loose. This removable attachment may be made stronger than the frangible section for increased strength during transport of the cone and does not prevent the cone from being used either as a whole or in two separate parts.

Although a snap connection between the two parts is

preferred, with engagement between respective protrusions on each, other possibilities are envisaged, such as a screw thread or a bayonet connection.

It is envisaged that the cone will consist of an injection moulded plastics tube but other materials such as cardboard may be possible. The tube will be almost divided into two halves near its centre, the halves however being held together by a thin membrane around its circumference. An alternative would be for the frangible section to comprise a circumferential slot bridged by a small number of easily broken tabs.

Of course, the frangible section need not be precisely in the centre of the cone and the principle of the invention could equally be applied to cones carrying three or more separate windings, with frangible sections between each adjacent pair.

The method of winding the cones may be carried out on existing automatic thread winding machines without extensive modification. The modifications necessary are described below in relation to Figure 4 of the drawings.

Drawings

Figure 1 is a side view of a fully wound cone according to the invention.
Figure 2 is a side view, partially in section, of the cone of Figure 1 in an unwound condition.
Figure 3 is an enlargement of part of Figure 2.
Figure 4 is a cut away perspective view of part of a known automatic thread winding machine.
Figure 5 is a side view of the machine of Figure 4 on a creel.

Description of Preferred Embodiment

The cone 8 of Figures 1 to 3 is a slightly tapering hollow tube of plastics material, with a circumferential step 12

approximately halfway along its length. Figure 1 shows how, following the winding process, a thread 10 forms a winding on the cone 8 at each side of the step 12 but not where the thread 10 crosses the step 12.

Figure 3 illustrates the step 12 in more detail, showing how the two halves of the cone 8 are connected by only a thin membrane 14 around the circumference at that point. The membrane 14 is easily broken, allowing the two halves of the wound cone to be used separately.

If it is desired to transport the wound cone before use or to use the whole cone together, the membrane 14 may be broken by pushing the two halves of the cone axially together, rather than by pulling them apart. An outwardly facing bead 18 on the rim of the smaller diameter cone part is urged over an inwardly facing protrusion 17 on the larger diameter cone part, until the bead 18 locates within an annular recess 16 in the larger diameter cone part. Engagement between the bead 18 and the protrusion 17 holds the two halves of the cone together, so that the mutually facing surfaces of the respective windings are closer to one another than could be achieved by the winding machine. Thus the strand of thread 10 between the two windings is effectively trapped.

The automatic thread winding machine partially shown in Figure 4 comprises a thread guide 20 mounted on a rod 21 for depositing thread on a cone (not shown). The machine shown in Figure 4 comprises a cam follower 23 which can be secured to the rod 21 by tightening a nut 24. The cam follower 23 has a projection engaging in a cam slot 25 on a drum 26. Rotation of the drum 26 advances and retracts the rod 21 along the cylinder as the guide 20 deposits thread thereon. In general, more than one reciprocating thread guide 20 is driven from a single cam 25.

The machine illustrated is well known; it is modified for

carrying out a method according to the invention as follows. The machine is provided with a rotation counter and an electro-pneumatic valve (not shown). When the counter registers the desired number of turns wound on the first half of the cone, it causes the electro-pneumatic valve to move the drum 26 axially from a first winding position to a second winding position. The counter is then reset electrically and when it registers the desired number of turns wound on the second half of the cone, the fully wound cone is ejected in the usual way and the electro-pneumatic valve retracts the drum 26 to the first winding position ready to wind another cone.

In Figure 5, the machine of Figure 4 is shown in outline only with the yarn guide 20 and rod 21 indicated adjacent a space 30 in which a cone according to the invention may be mounted to have thread wound thereon. Supply packages 31 are loaded on the creel, and thread ends 32 are drawn off towards the guide 20.

CLAIMS

1. A cone on which thread (10) is wound, characterized by having a central frangible section (12) at which it may easily be broken into two parts generally perpendicularly to its axis and the thread forming a winding on the cone at each side of the frangible section, leaving a space between the windings where the thread (10) crosses the frangible section.

2. A cone according to claim 1, including means for removably attaching together the two cone parts after the frangible section (12) has been broken, so as to reduce the space between the respective windings.

3. A cone according to claim 2, wherein after the frangible section (12) has been broken one of the cone parts can be partially inserted in a hollow of the other cone part, where it is removably retained by engagement between protrusions (17,18) on the respective parts.

4. A cone according to claim 3, wherein the protrusions (17,18) on the cone parts are respectively a radially outwardly directed bead around the rim of the one cone part and a radially inwardly directed bead around the hollow of the other cone part.

5. A cone according to any preceding claim, wherein the frangible section (12) is a thin membrane connecting the two cone parts.

6. A cone according to any preceding claim, wherein the two cone parts both taper slightly in the same axial direction.

7. A method of winding thread on a cone (8) having a central frangible section (12), the method comprising the steps of:

(a) rotating the cone (8) while supplying thread

(10) through a yarn guide (20) that reciprocates relative to a datum (26) and parallel to the axis of the cone (8) to wind thread on the cone (8) at one side of the frangible section (12);

(b) advancing the yarn guide datum (26) through a fixed distance along the axis of the cone (8); and

(c) rotating the cone (8) while supplying thread (10) through the reciprocating yarn guide (20) to wind thread on the cone at the other side of the frangible section (12).

8. A method according to claim 7, wherein step (a) is continued until a first predetermined number of turns of thread (10) have been wound on the cone (8) and step (c) is continued until a second predetermined number of turns of thread (10) have been wound on the cone (8).

9. A method according to claim 7 or claim 8, wherein the reciprocating action of the yarn guide (20) results from its engagement with a rotating cam (25) and wherein the step of advancing the yarn guide datum (26) includes advancing the cam (25) along its axis of rotation.

10. A method according to any of claims 7 to 9, comprising the further step of:

(d) breaking the frangible section (12) of the cone (8) and urging the two cone parts axially towards one another to attach the parts removably together with a reduced space between the two windings.

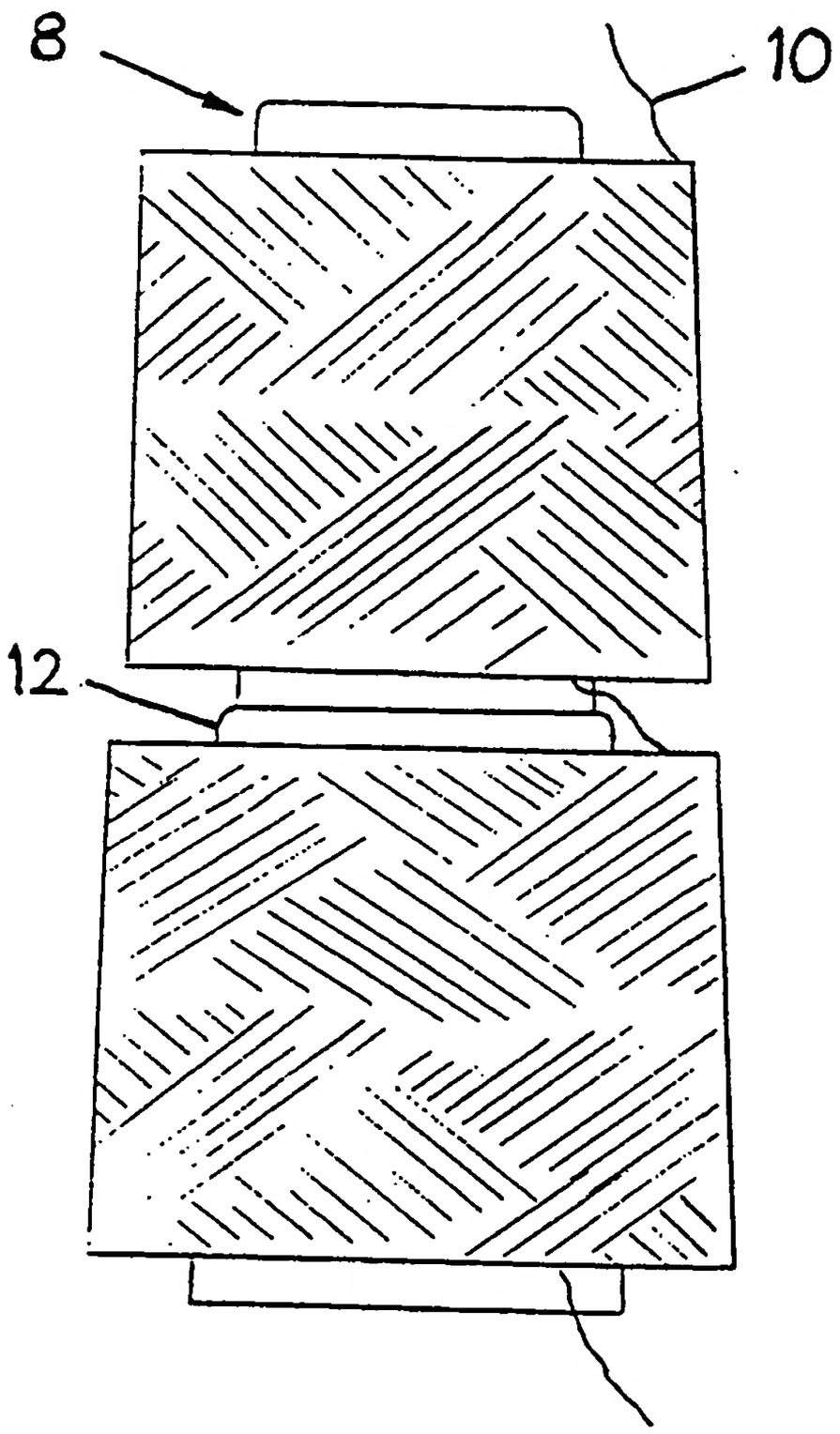


Fig 1

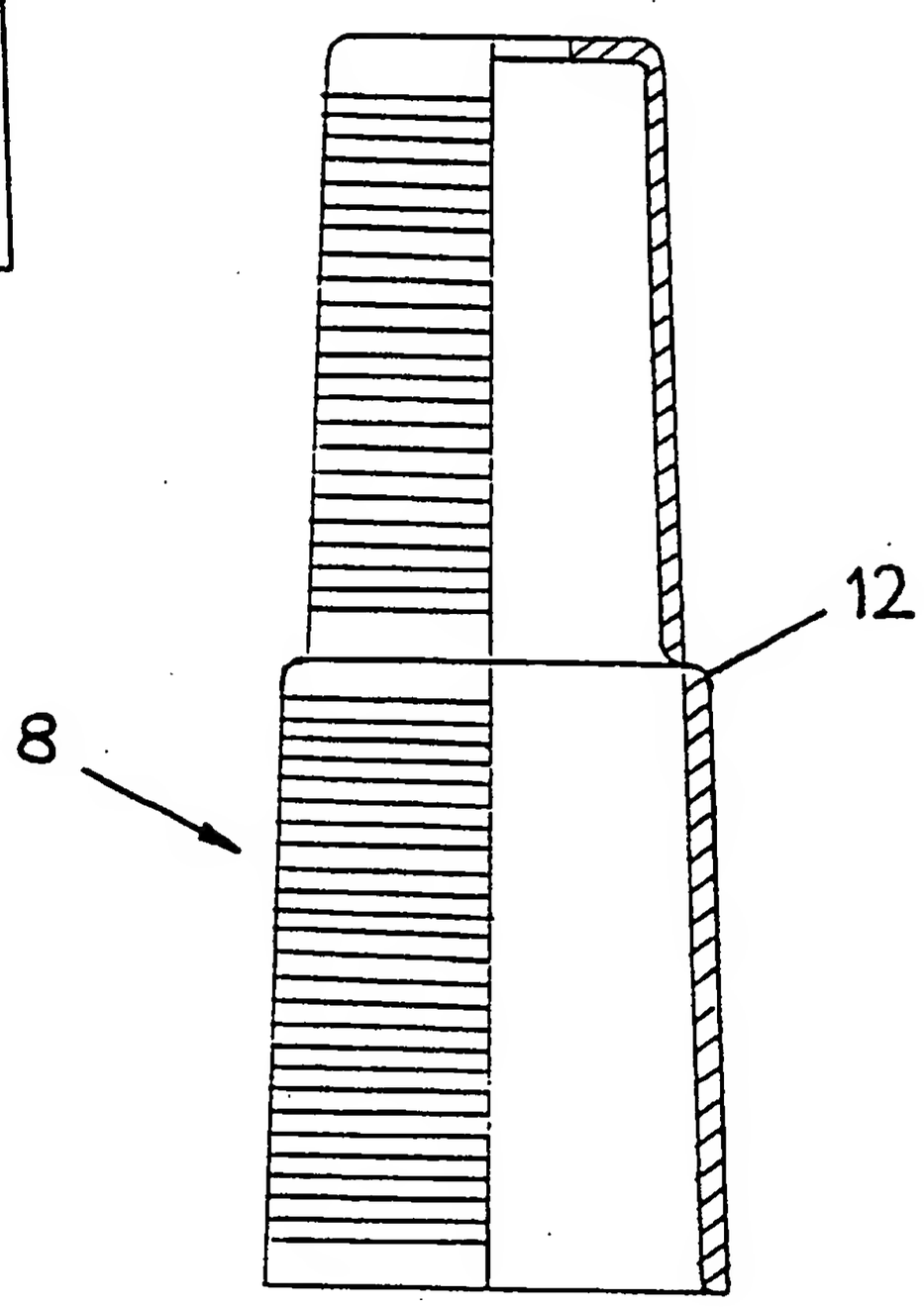


Fig 2

Fig 3

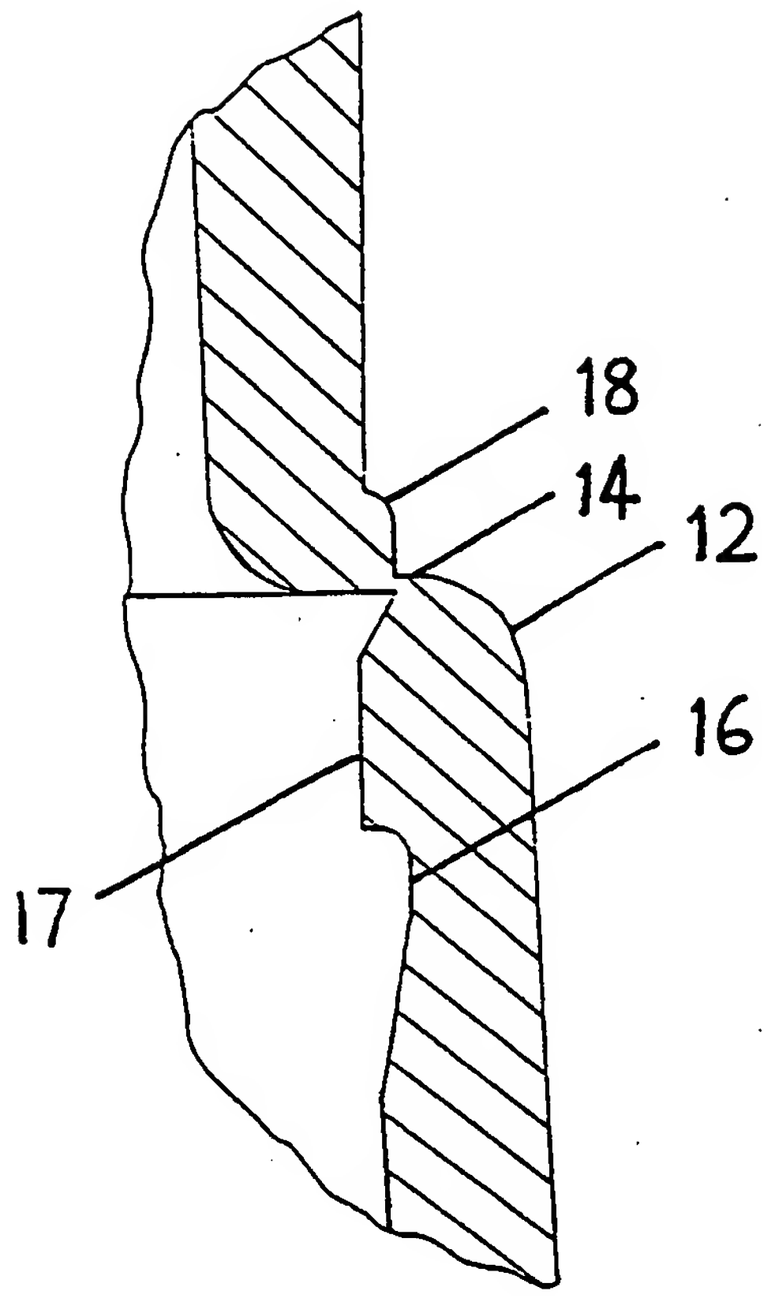
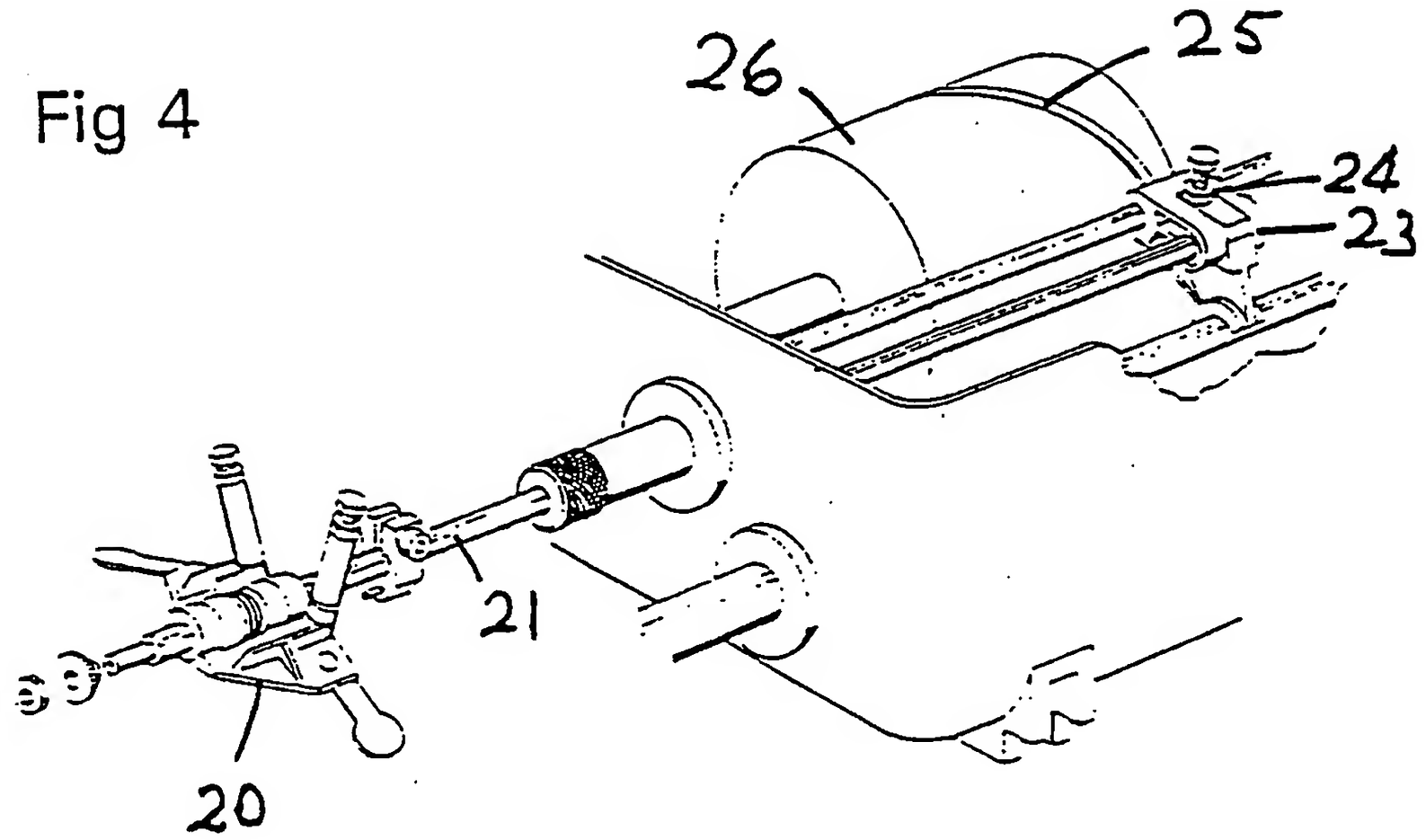


Fig 4



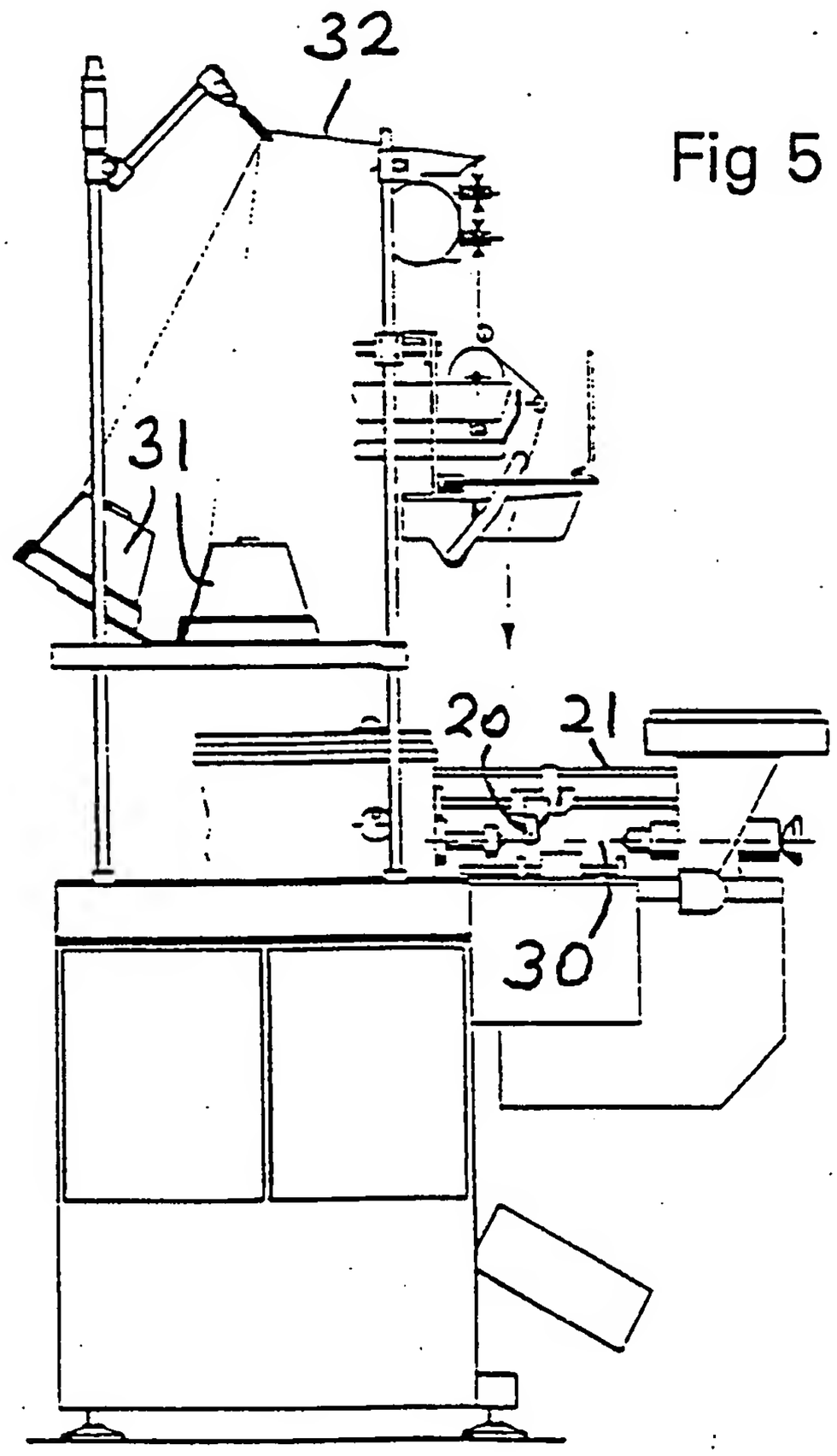


Fig 5

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/GB 93/01501

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 B65H75/18 B65H67/056

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 B65H D05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BE,A,428 899 (P. ANDRIEU) 30 June 1938 see the whole document	1,7,8
X	US,A,2 235 737 (J.T. CRANDALL) 18 March 1941 see the whole document	1,7,8
X	DE,A,31 35 693 (K. BOUS) 24 March 1983 see page 4, line 23 - page 6, line 3 see page 9, line 1 - line 14 see page 11, line 5 - line 16	1,7,8
A	US,A,2 524 623 (E. COLOMBU) 3 October 1950 see figure 3	7-9
A	US,A,1 915 200 (E.F. PARKS) 20 June 1933	

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 October 1993	08. 11. 93
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Authorized officer D HULSTER, E

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

In. tional Application No
PCT/GB 93/01501

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE,B,27 55 915 (SAURER-ALLMA GMBH) 17 May 1979 ---	
A	FR,A,1 113 603 (D.R. GÜTERMANN) 3 April 1956 -----	

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

In tional Application No
PCT/GB 93/01501

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
BE-A-428899		NONE	
US-A-2235737		NONE	
DE-A-3135693	24-03-83	NONE	
US-A-2524623		NONE	
US-A-1915200		NONE	
DE-B-2755915	17-05-79	NONE	
FR-A-1113603		BE-A- 533543 CH-A- 310791 DE-C- 967784	